# CLAIMS

1) A method of producing superconducting cables from bars comprising a core defined by a mono- or multifilament of superconducting material, in particular an NbTi alloy, and by a copper sheath, possibly with the interposition of a barrier layer of noble metal or metal alloy, wherein said bars are assembled inside a copper shell, and wherein the assembly so formed is subjected to a number of successive plastic deformation steps; characterized by comprising exclusively cold plastic deformation steps.

2) A composition method for obtaining a bar-like semifinished product, in particular for use in the production method as claimed in Claim 1, characterized by comprising the steps of:

- forming bars of superconducting copper, as claimed in Claim 1, having a round cross section and relatively long length;

- assembling said bars about a cylindrical copper core of substantially the same length, using assembly templates which open book-fashion and are fitted to and slide along an assembly bench, the templates having through holes arranged in a circle to support the bars, and a central through seat for supporting the core;

- tying the bars onto an outer lateral surface of the core to obtain an assembly defined by the bars assembled by ties in a circle against the core;

- sliding onto a first end of the assembly so formed a number of metal supporting rings resting on the assembly bench and enclosing said bars, while sliding said templates off a second end of the assembly opposite the first;

- sliding a copper tube onto the assembly so formed, starting from said first end, while at the same time cutting the ties progressively as they are reached by the tube, and sliding off said supporting rings at the second end, so as to eventually obtain an assembly/copper tube assembly in which the bars are retained in position on the copper core by the copper tube mounted concentrically with the core;

- performing a number of drawing operations on the assembly/copper tube assembly to gradually reduce its cross section and so increase its length to obtain a bar-like semifinished product of the required dimensions.

3) A method as claimed in Claim 2, characterized in that said rings have substantially the same radial dimensions as the copper tube, and are pushed towards said second end by the copper tube as it is fitted gradually onto said assembly.

4) A method as claimed in Claim 2, characterized in that, at the end of the cold drawing steps, said bar-like semifinished product is subjected to salt bath heat treatment.

5) A method as claimed in Claim 4, characterized in that, prior to said salt bath heat treatment step,

opposite ends of said bar-like semifinished product are closed substantially in fluidtight manner by caps.

6) A method as claimed in Claim 5, characterized in that said caps are cup-shaped to fit onto said opposite ends of the bar-like semifinished product; and in that said caps are made of material having a lower thermal expansion coefficient than copper, e.g. iron, so as to be self-sealing.

7) A method as claimed in Claim 2, characterized in that said assembly/copper tube assembly is first subjected to a first drawing step to achieve a relatively small reduction in section ranging between 4% and 9%, and so lock said copper core, said copper tube, and said bars mechanically integral with one another; and then to a number of successive drawing steps, each producing a constant reduction in section, to obtain the required dimensions.

8) A method as claimed in Claim 7, characterized in that each of said successive drawing steps is performed to obtain a roughly 18 to 24% reduction in section of the assembly/copper tube assembly.

9) A method as claimed in Claim 2, characterized in that said copper tube is slid onto said assembly by a "pinch-roll" device fitted removably to one end of said assembly bench, at said first end of the assembly; said "pinch-roll" device comprising two rollers pressed against each other by compression means, and between which the tube is pinched; and at least one of the

rollers being rotated by a motor.

10) A method as claimed in Claim 9, characterized in that, at said second end of the assembly, said assembly bench is fitted with a counter-head movable axially towards said "pinch-roll" device; as said copper tube is fitted on, the assembly being held resting axially against said counter-head; and the final stage in the step of fitting the copper tube onto the assembly being performed by stopping rotation of said rollers to arrest the copper tube, and by feeding said counter-head axially forward to insert the assembly inside the tube.

11) A method as claimed in Claim 2, characterized in that, prior to said step of assembling said bars about said copper core, the bars and the core are subjected to chemical treatment by immersion in a number of baths, and to a drying step, which are performed by inserting the bars and the core inside an open-sided rotary basket designed to support the full length of said bars and said core, and by immersing the rotary basket into said baths.

12) A superconducting NbTi cable produced using the method as claimed in Claim 1, and characterized by having a relatively high critical current (Jc), normally at least 20% higher than that of superconducting cables of the same section and chemical composition, but obtained from hot extruded semifinished products.